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CDC

Mississippi Childhood Lead Poisoning Prevention Guidance

MISSISSIPPI
STATE DEPARTMENT OF HEALTH

Childhood Lead Poisoning Prevention Guidance

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LEAD POISONING PREVENTION ADVISORY BOARD	
Susan Buttross, M.D, F.A.A.P, Director Division of Child Development and Behavioral Medicine The University of Mississippi Medical Center 2500 North State Street Jackson, MS 39216 (601) 984-5236	Elizabeth Lynch, RN, B.S.N. MCH Programs EPSDT Review Nurse Office of the Governor Division of Medicaid 239 North Lamar Street, Suite 801 Jackson, MS 39396 (601) 359-6293
Geraldine B. Chaney, M.D., F.A.A.P. Capitol City Children's Clinic P. O. Box 9228 Jackson, MS 39286-9228 (601) 362-7476	Kelly Perkins Business Manager/MIS Specialist Family Health Care Clinic P. O. Box 6227 Pearl, MS 39288 (601) 825-3163
Marinelle Payton, M.D., Ph.D., M.S., MPH Chair, Dept. of Public Health, Jackson State University School of Allied Health Sciences 350 W. Woodrow Wilson Ave, Suite 320 Jackson, MS 392113 (601) 368-2052	Cynthia Huff Safe Kids Coalition 754 N. President St. Jackson, MS 39202 (601) 969-0669
Michael Hughes, Director UMC Poison Control 2500 North State Street Jackson, MS 39216 (601) 984 -1680 Fax (601) 984 -1676	Gretchen Mahan ,Chapter Executive Director American Academy of Pediatrics P. O. Box 4725 Jackson, MS 39206-4725 (601) 605-6425
Zipora Martin, RN Pediatric Supervisor Jackson-Hinds Comprehensive Health Center 4433 Medgar Evers Blvd. P.O. Box 3437 Jackson, MS 39213 (601) 362-5321	Lauren Pearson Parent Advocate 3007 Stonehenge Dr. Brandon, MS 39042 (601) 359-6713
William H. Sorey, M.D. Associate Professor of Pediatrics UMC - Department of Pediatrics 2500 North State Street Jackson, MS 39216 (601) 984-2195	Johnny Beason, Environmental Administrator Office of Pollution Control MS Dept. of Environmental Quality 101 W. Capitol St. Jackson, MS 39289-0385 (601) 961-5595
Xemonia Young, Health Service Specialist Hinds County Human Resource Agency Project Head Start P. O. Box 22657 Jackson, MS 39225 (601) 923-1817	Edna C. Clark, LSW Social Work Advanced, Protection Unit Division of Family & Children Services MS Department of Human Services P. O . Box 352 Jackson, MS 39205 (601) 359-4999
Gerri Cannon-Smith, M.D., F.A.A.P., MPH Pediatric Consultant P. O. Box 1385 Brandon, MS 39043 (601) 825-3163	John Spears Public Housing Revitalization Specialist U.S. Department of Housing and Urban Development 100 W. Capitol St. Room 910 Jackson, MS 39269-1096 (601) 965-4700

Mississippi State Department of Health
570 East Woodrow Wilson/P. O. Box 1700
Jackson, MS 39215-1700

Personal Health Services	
Daniel Bender, Office Director **Health Services**	**Dr. Marilyn Graves** **Medical Director, CMP**
Cynthia L. Cline, RN **Child Health Nurse Consultant**	**Dr. Marianne Zotti** **MCH Epidemiologist**
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Epidemiology	
Bruce Bracken **Division of Communicable Diseases**	
General Environmental Services	
Keith Maranger - Environmentalist **Lead Program Specialist**	**Tim Darnell, Bureau Director** **General Environmental Services**

Introduction

Lead Poisoning is the most common preventable environmental health problem in children. Although the incidence of elevated blood lead levels has decreased over the past three decades due to the removal of lead in house paint and gasoline, lead poisoning remains a significant problem. Clinical studies consistently show symptomatology at blood lead levels $\geq$45 mcg/dL, and some studies show effects on learning and behavior at levels $\geq$10 mcg/dL.

The previous lead guidelines from the Centers for Disease Control (CDC) have referenced various adverse effects of low-level lead exposure. The most recent guidelines considers the threshold for action at a blood lead level as low as 10 mcg/dL in children.

Through efforts of this document and public health and healthcare professionals, and community participation, we hope to eliminate the problem of childhood lead poisoning.

Mississippi Childhood Lead Poisoning Prevention Guidance

PURPOSE

The Mississippi Childhood Lead Poisoning Prevention Guidance was developed to support the efforts of the United States Public Health Service (Healthy 2010) to eliminate childhood lead poisoning in Mississippi. The guidance was developed following recommendations from the Center of Disease Control (CDC) to provide guidelines on lead poisoning prevention for children.

Many professionals are involved in the effort to identify and to intervene in childhood lead poisoning prevention. The Childhood Lead Poisoning Prevention Advisory Board was established to provide comprehensive input into this strategic planning process. A list of the Advisory Board members is on page iv.

The document will be distributed to Health Departments, Community Health Centers, physicians including pediatricians and family practitioners, housing authorities, environmental agencies, and other agencies, programs, and citizens that seek guidance about what constitutes harmful levels of blood lead.

TARGET POPULATION

Children age 6 months to 6 years in at risk categories as defined by CDC:

- Child whose parents answer "yes" or "don't know" to questions on the CDC risk questionnaire (See Appendix A)
- Medicaid recipients or Medicaid eligible children
- Pregnant women
- Children over age 6 with persistent lead elevations ($\geq$20 mcg/dL) requiring Medical management

In 1991, CDC recommended lead screening for all children 6-72 months of age (universal screening), except in communities with data to document that children were not at risk for lead poisoning. In 1997, CDC revised its screening recommendations to target only certain populations of children (targeted screening). It now recommends screening all children aged 6-72 months of age only in zip codes where 27 % or more of the housing was built before 1950, or in zip codes where 12 % or more of the children tested for lead had venous blood lead levels of 10 mcg/dL or more.

Universal vs targeted screening in Mississippi is pending compilation of current data on percent of children with BLL $>$10 mcg/dL. ***Mississippi should follow guideline for universal screening of children 6-72 months of age.*** As more current data is available, the Lead Advisory Board may suggest to Public Health officials that targeted screening be implemented based on CDC recommendations.

GOAL

The goal of the Childhood Lead Poisoning Prevention Guidance is to identify children at risk for lead poisoning and to intervene appropriately.

OBJECTIVES

A. To provide uniformity in screening, identification, and intervention for children who are at risk for lead poisoning in the state of Mississippi.

Activities

- **Assessment of risk** (utilizing the CDC Risk Assessment Questionnaire): (1) Assess children at risk for lead exposure, (2) Provide counseling on lead exposure based on the outcome of the questionnaire, and (3) administer the questionnaire to children during their well-child visit and on occasions when there are changes in the child's environment or community.

- **Screening**: Blood lead measurement is the acceptable method of screening. A venous specimen is the preferred method, although capillary samples are acceptable. A diagnostic BLL is the first venous BLL obtained within 6 months of an elevated screening BLL

  According to current Medicaid Guidelines medicaid recipient or medicaid eligible children should be screened routinely at ages 12 and 24 months and at any time risk factors are identified, see Risk Assessment Questionnaire, Appendix A.

  Any child between 6-72 months whose parent answered "yes" or "don't know" to any questions on the risk assessment questionnaire, should be screened. Particular attention should be given to children exposed to folk remedies, immigrant children, children who are abused, neglected, malnourished or who practice pica.

- **Schedule for BLL screening:**
  - Routinely, at age 12 and 24 months (12 months between samples).
  - At any time between 36-72 months if not previously screened.
  - At anytime between age 6-72 months if risk assessment indicates possible exposure.
  - Annually (age 6-72 months) with risk factors or/and BLL $\geq$ 10 mcg/dL.
  - Anytime when medically indicated in work-up of some unexplained illnesses (example: severe anemia, seizures, lethargy, abdominal pain).

B. To enhance public awareness of lead hazards, hazard reduction, prevention strategies, and abatement.

Activities

- Enhancement of public education will be promoted by the State Lead Coordinator and the Education Subcommittee of the Lead Advisory Board. Methods may include but are not limited to: distribution of pamphlets and brochures, participation in Health Fairs, coordination of educational programs with Head Starts, Day Care programs and other avenues with access to caretakers.

- The State Health Department staff will continue to strive to improve the quality of surveillance data collected from both public and private sources to obtain as accurate as possible prevalence data for analysis plan, revision, and feedback to the community at large.

C. To update the health professional on new lead guidelines, their implementation, and relevance to public health.

Activities

- The Mississippi Childhood Lead Poisoning Prevention Guidance is to be updated as needed based on results of data collection, needs assessments, changes in census tract, zip code data, or new guidelines from the CDC, AAP, or other organizations promoting child and community health. Promotion of education among Health Care Providers will likewise be accomplished through distribution of educational materials, through professional organizations and workshops (as funding permits), with Child Health personnel. Legislative and education subcommittees will work as liaisons to the Lead Advisory Board.

MANAGEMENT OF ELEVATED BLOOD LEAD LEVELS PER MISSISSIPPI DEPARTMENT OF HEALTH PROTOCOL

The Health Department will provide recommendations for follow-up, coordination of services, nutrition consultation and environmental investigation per protocol. Interventions may be adapted for special circumstances. Blood lead levels ≥ 10 mcg/dL must be reported to the Mississippi State Department of Health Childhood Lead Poisoning Prevention Program (CLPPP). Laboratories are requested to report **all** Blood Lead Levels.

Recommended Care, According to Diagnostic Blood Lead Levels(BLLs):
Regular measurements of the BLL of a child with an elevated diagnostic test result are important because the BLL may continue to rise. Rising BLLs are especially likely in children 6 months to 2 years of age because this is the age group in which mouthing behavior is most frequently seen.

BLL (mcg/dL)	**Action**
< 10	No action required within one year, unless clinically indicated.
10-14	Obtain a confirmatory venous Blood Lead Level (BBL) within 1 month; if still within this range:
	• Provide family lead education, screen other children in household under 6 years of age,
	• Refer to nutritionist for nutritional counseling check hct/hgb (iron deficiency),
	• Obtain a developmental screening (ie. Denver II).
	• Repeat BLL test every 3 months, until 2 venous results <10 mcg/dL or 3 results <15 mcg/dL, then annually.
15-19	Obtain a confirmatory venous BLL within 1 month; if still within this range:
	• Provide family lead education, screen other children in house household under 6 years of age,
	• Refer to nutritionist for nutritional counseling, check hct/hgb (iron deficiency),
	• Obtain a developmental screening (ie. Denver II). For Persistent 15-19 mcg/dL, refer for (1) environmental investigation (2) to Early Intervention Program (EIP) per clinician's referral of possible developmental delay,

BLL (mcg/dL)	Action
	• Home visit by nurse, social worker or other qualified individual for noncompliant patients with BLL of 15-19 mcg/dL and complete the Lead Screening Follow-up Home visit, Form #221,
	• Consult MSDH Clinician and inform child's Primary care Provider (PCP) of elevated lead level,
	• Repeat BLL test every 3 months, until 2 venous results <10 mcg/dL or 3 results <15 mcg/dL, then annually. If BLL remains 15-19 mcg/dL after 6 months repeat annually,
20-44	Obtain a confirmatory venous BLL within 1 week; if still within this range:
	• Provide family education, screen other children in house hold under 6 years of age,
	• Refer to nutritionist for nutritional counseling, check hct/hgb (iron deficiency),
	• Obtain a developmental screening (ie Denver II), Refer to Early Intervention Program (EIP), per clinician's referral of possible developmental delay,
	• Refer for an environmental investiagation,
	• If BLL is 20-25 mcg/dL, consult MSDH Clinician and inform child's PCP of elevated lead level, • If BLL is >25mg/dL, immediately inform MSDH Clinician and refer to child's PCP: (**consider** chelation although chelation is not currently recommended for BLL <45 mcg/dL). Provide coordination of care, clinical management, complete medical history and physical examination.
	• Clinical management: Repeat BLL within 1-2 month intervals until these three conditions are met: (1) BLL has remained <15 mcg/dL for at least 6 months and (2) lead hazards have been removed or child lives in a lead environment and (3) no new exposure, then annually. If BLL remains between 20-44 mcg/dL after 6 months refer to physician for recommended follow up.
45-69	Obtain a confirmatory venous BLL within 2 days; if still within this range:

BLL (mcg/dL)	Action
	• **Immediately** refer to child's PCP for a complete medical history, a physical examination and developmental screening, (begin chelation therapy in consultation with clinicians experienced in lead toxicity therapy),
	• Within 48 hours, begin coordination of clinical management; environmental investigation and recommendation for lead hazard control,
	• Provide family lead education, screen other children in household under 6 years of age,
	• Refer to nutritionist for nutritional counseling, check hct/hgb (iron deficiency),
	• Significant Toxic Potential: Repeat BLL per physician/clinician's order.
≥ 70	**Medical Emergency.** Refer child's PCP to hospitalize the patient and begin medical treatment immediately in consultation with clinicians experienced in lead toxicity therapy.
	• Obtain a confirmatory BLL immediately,
	• Chelation therapy recommended,
	• The rest of the management should be the same as for management of children with BLL between 45 an 69 mcg/dL.

Coordination of Care

A variety of patient care providers play a key role in the coordination of childhood lead poisoning prevention services. It is imperative that each provider know what services are available, so that they can use these services and resources effectively. Coordination of care is an effort to ensure that all aspects of childhood lead poisoning prevention - health, housing, and environmental are being addressed, and to provide the most comprehensive and cost effective services to at-risk children, and their family.

Provider	**Responsibility**
Primary Care Providers★ MSDH Physician/Clinicians♦	★Report all elevated BLL to MSDH, CLPPP, State Lead Coordinator ♦Elevated results are reported directly to the MSDH, CLPPP from laboratories
	★Medical management/Chelation when appropriate ♦Medical management when appropriate
	★♦Developmental Assessment obtain/review (i.e. Denver II)
	★♦Referral to Early Intervention Program (EIP), Children Medical Program (CMP), Women Infants and Children (WIC), and Perinatal High Risk Management (PHRM) as appropriate.
	★♦Communicate with patient care providers (i.e. nurse, social worker, environmentalist, etc.) to ensure that lead poisoned children receive appropriate medical, environmental and social service follow up**.**
State Lead Coordinator	Serves as a liaison between the family, health care provider and the environmentalist.
	Receive elevated BLL reports and maintain computer data base.
	Provide educational materials on lead and serve as a resource agent.
	Monitor case management follow up.

Provider	Responsibility
	Submit monthly reports to District Maternal Child Health Coordinators.
State Lead Environmentalist	Provide environmental investigation and recommendations for lead hazard control (all dwellings where the child spends at least 6 hours a week).
	Submit reports of assessment to appropriate personnel.
	Provide counseling on interventions to reduce lead exposure**.**
Early Intervention Program Service Coordinator	Coordinate appropriate developmental evaluation, follow-up and counseling as indicated when a child has been referred for medical management with possible developmental delays from birth-36months of age.
Nutritionist	Provide nutritional counseling, see MSDH Nutrition Protocol section in this guidance and refer to WIC if appropriate.
Nurse ◇ Social Worker★ (County Health Department Patients**)**	◇★Screen all children between the ages of 6 - 72 months. Complete a Blood Lead Poisoning Summary Sheet (Risk Assessment Questionnaire) Form #222.
	♢★Provide family lead education. Document education in Child Health Record**.**
	♢Provide home visit for noncompliant patients with BLL of 15-19 mcg/dL and complete the Lead Screening Follow- up Home Visit, Form #221 and retest.
	♢Screen the child using the Denver II screening form. If there is a delay or lag in the child's developmental progress refer to Early Intervention Program as indicated.
	♢★Refer to other services; i.e. CMP, PHRM, DHS etc. when appropriate.

Provider	Responsibility
	♢ Repeat BLL testing as indicated or per clinician's recommendation.
	♢Test other children in house hold under 6 years old if a sibling has an elevated blood lead level.
	♢Assist family in applying for public housing or Section Eight Housing if indicated.

Guidance for Clinicians

Children with elevated blood lead levels may be asymptomatic or may exhibit symptoms such as follows:

- MILD TOXICITY — Myalgia or paresthesia, occasional abdominal discomfort, mild fatigue, irritability, lethargy.
- MODERATE TOXICITY — General fatigue, arthralgia, difficulty concentrating, muscular exhaustibility, tremors, headache, diffuse abdominal pain, vomiting, weight loss, constipation, behavioral changes, developmental delays.
- ACUTE LEAD ENCEPHALOPATHY — Coma, seizures, bizarre behavior, ataxia, apathy, incoordination, vomiting, alteration in the state of consciousness, subtle loss of recently acquired skills.

Any one or a combination of these symptoms, associated with an elevated blood lead level, is an acute medical emergency. Lead encephalopathy is almost always associated with a blood lead level exceeding 100 mcg/dL; although, occasionally it has been reported at blood lead levels as low as 70 mcg/dL. Even when identified and promptly treated, severe and permanent brain damage may result in 70%-80% of children with lead encephalopathy. Children with symptomatic lead poisoning with or without encephalopathy represent an acute medical emergency. The possibility of lead encephalopathy should be considered in the differential diagnosis of children presenting with coma and convulsions of unknown etiology.

Except for coma and seizures, symptomatic lead poisoning without encephalopathy is characterized by symptoms similar to those of lead encephalopathy. These symptoms are usually associated with a blood lead level of at least 70 mcg/dL, although, occasionally cases have been associated with levels as low as 45 mcg/dL. If blood lead level is below 45 mcg/dL, other causes of the symptoms should be sought.

History

A detailed history is obtained including:

Presence or absence of clinical symptoms, decrease in play activity, lethargy, anorexia, sporadic vomiting, intermittent abdominal pain and constipation. (With a blood lead level <45mcg/dL, other causes of the symptoms should be sought.)

- Document child's mouthing activities.
  Existence of pica.
- Nutritional status (encourage high iron and calcium, low-fat) and dietary habits.
  Family history of lead poisoning.
- Potential sources of lead exposure (as noted on questionnaire).
- Occupational history of adults in the household.
- Environmental and occupational histories of adults in other places where the child spends a lot of time.
- Previous blood lead measurements.
- Developmental history/loss of milestones.

Physical Exam

A physical examination should be performed with careful attention given to the neurological examination, psychosocial and language development. Prompt referral of any cognitive, speech/language, neurobehavioral or other developmental abnormalities should be made. First Steps Early Intervention Program can assist with these referrals up to age three or transitioning into the school system. Older children may be referred to the Child Development Clinic at University Mississippi Medical Center (UMMC), Department of Pediatrics or other developmental specialists as indicated.

<u>Prior to chelation:</u>
Confirm referral for environmental assessment.
Obtain lab: CBC, liver enzymes, AST, ALT, Hct/Hgb, BUN, Creatinine, dip UA, serum ferritin if Hct less than 33% and repeat lead level.

Therapy

Medication should be based on symptomatology along with BLL. Treatment should be supervised by a physician experienced in lead treatment. Because of potential toxicity, children must be monitored closely during this treatment and should be supervised by a physician experienced in lead poisoning. (**THIS GUIDANCE SHOULD NOT BE USED AS A SOLE SOURCE OF INFORMATION REGARDING TREATMENT.**)

Mississippi Regional Poison Control Center : For assistance in the management of a specific pediatric lead poisoning case, you may call the Mississippi Regional Poison Control Center at 1-800-222-1222 (24 hr). The center has available the Micromedix computerized data base as well as many other references on lead and lead poisoning. In addition to assisting you with initial assessment and case management recommendations, follow-up blood lead levels can be provided through the U.M.M.C. Analytical Toxicology Laboratory. For more serious or complicated cases, consultation with a medical toxicologist can be arranged.

Chelation

Chelation may be considered at lower levels on case-by case basis; levels above 70 mcg/dL are considered a medical emergency and require intervention. Efforts should be made to maintain the child in a lead free environment during treatment and until the source of lead is eliminated.

Chelating Agents

Product Name	Abbreviation
Calcium Disodium Versenate	CaNa2 EDTA
Dimercaporl	BAL
Cuprimine	D-pencililamine*
Chemet (Succimer)	DMSA

*Although not approved for this use, it is used in some centers. Until introduction of Succimer, it was the only available oral agent. Requires treatment for 28 days.

*Centers for Disease Control and Prevention, Preventing Lead Poisoning in Young Children, October 1991

Treatment for BLL 45mcg/dL or greater

Succimer: Dose: 10mg/kg tid on day 1-5 treatment, then reduce dose to 10 mg/kg bid for an additional 14 days.* Liver enzymes and CBC should be checked on day 5 and at the conclusion of the course of therapy. Succimer is a 100mg capsule which may be emptied into palatable food. Observed for side effects: abdominal distress, transient rash, elevated hepatocellular enzymes and neutropenia. Treatment should be stopped and cautiously

resumed if side effects resolve. Consultation with physician experienced in use of Succimer is advise.

EDTA: only CaNa2EDTA (i.e. Never use NA2EDTA) may be alternative to Succimer. Administered IV for 3 to 5 days. Dose: 35-50 mg/kg/day in dextrose and saline solution at concentration not greater than 9.5%.

BLL 70 mcg/dL or greater or if symptomatic: Admit to hospital per physician recommendation. Verify contact with State Lead Coordinator for environmental assessment. Treatment should begin immediately with BAL followed by EDTA.

BAL: Dose 15-25 mg/kg/day in four doses. Administered IM. Continue for 5 days or until lead level less than 60 mcg/dL. **Do not treat iron deficiency anemia during treatment with BAL. BAL should not be used in persons allergic to peanuts**.

Post Chelation Follow-up:

Because of post treatment rebound, blood lead level should be checked 7 to 21 days after treatment to determine if further treatment is indicated. Repeat chelation is indicated for BLL's above 45 mcg/dL. Children requiring chelation require long-term follow-up. Liver enzymes and CBC should be monitored. The child should be in a lead free environment. All children undergoing chelation should be seen every other week for 6-8 weeks, then once a month for 4-6 months. (Reference: Preventing Lead Poisoning in Young Children, October 1991)

References:

The Harriet Lane Handbook, 15th Edition, 2000
Preventing Lead Poisoning in Young Children, CDC, October 1991
Handbook of Pediatric Environmental Health, AAP 1999
Nelson Textbook of Pediatrics, 16th Edition, 2000

Mississippi State Department of Health Nutrition Protocol

Lead toxicity interferes with many metabolic processes and normal physiological functions. Lead toxicity induced anemia is due to the inhibition of heme synthesis by lead. Severe cases of toxicity can cause kidney damage and result in excessive urinary nutrient loss. The immune system is depressed and children cannot fight infections efficiently. Although many effects of lead toxicity are reversible, the neurological effects **are not** reversible.

Preschool children are at greatest risk due to their higher metabolic rate and efficient gastrointestinal absorption rates of mineral elements. In addition, mouthing behaviors and pica may result in the ingestion of lead chips or dust.

Major Concerns

- Adequacy of diet: calcium, iron vitamin C and zinc
- Fluid intake
- Anemia
- Normal growth and development
- Potential lead in environment
  Participation in Women, Infants and Children Program (WIC), if eligible

Recommended Clinical Therapy

The goal is for a child to achieve normal growth and development and maintain venous lead levels within acceptable limits. Children with venous lead levels **greater** than 10 mcg/dL should be referred to a clinician for a medical evaluation and the child's care giver(s) should receive nutritional education and counseling by a Nutritionist.

Obtain Diet History and Assess for Following:

- Maintain adequate calories and protein with a variety of foods to meet age appropriate nutritional requirements

- Maintain adequate intake of vitamin C, Calcium, zinc, iron, fluid and fiber

- Plot Height for Age, Weight for Age, and Body Mass Index (BMI for children greater than or equal to two years) on **National Center for Health Statistics (NCHS) Growth Charts**

Obtain List of Current Medications

- Some medication may effect physiological conditions which will increase or decrease the absorption of lead.

Follow-Up/Referral Procedures

- Diet history and assessment should be completed at each follow-up visit; especially important if chelation therapy is utilized with patient
- Assessment of growth parameters should be completed at each follow-up visit
- List of medications utilized should be obtained at each follow-up visit

Refer for Special Diet Modification

- Make referral to local school nutritionist as needed to increase intake of calcium, iron, and Vitamin C rich foods

Desired Outcome

- Balanced diet with appropriate intake of calories, protein, calcium, iron, Vitamin C, fluids and fiber.
- Venous lead levels within acceptable limits
- Growth and development within normal limits

Reporting Requirements

It is a State Department of Health and Division of Medicaid requirement that all venous blood lead levels ≥10 mcg/dL be reported to the Childhood Lead Poisoning Prevention Program (CLPPP) at MSDH Central Office (601) 576-7447 within one week of diagnosis. Laboratories should report all lead levels at the end of the month. For venous blood lead levels ≥20 mcg/dL, an environmental investigation should be scheduled with the environmentalist. The State Lead Coordinator will coordinate with the environmentalist for environmental investigation. Lead Poisoning is considered a Class 2 reportable disease.

Procedure

For purposes of improving statewide surveillance and for possible funding opportunities (i.e., CDC grants), it is requested that all lead levels be reported to the Mississippi State Department of Health, CLPPP. The information listed below is required for lead surveillance and to insure an environmental assessment is done. The information can be transmitted in any of these ways:

- Complete a Reportable Disease and Conditions Card, Form #135 (Appendix C) and mail it to the address given
- Call State Lead Coordinator 601-576-7447 or fax: to 601-576-8035
- Call Lead Program Environmentalist 601-576-7721

Required Data:

- Patient's name*
- Address (including zip code)*
- Date of Birth*
- Phone number*
- Type of specimen (Venous or capillary)*
- Date of test*
- Results (mcg/dL)*

- Social Security number
- Medicaid number
- Parent/Guardian Name*
- Private Insurance
- Name of clinic where specimen was drawn*
- Clinic Address
- Clinic Phone number*
- Clinic contact person for lead screening

All information is critical to statewide data collection, but items with an asterisk (*) are crucial to entering the child into the data base and arranging for an environmental assessment.

Family Education

Lead poisoning is a disease caused by swallowing or inhaling lead. Lead is a metal and occurs in the environment as a result of industrialization. It may be found in paint, soil and dust, tap water, some toys, and crystal and pottery. Signs and symptoms may be irritability, nausea, developmental delays, behavior problems, hearing loss, growth failure, seizures and even death. It is very common and affects millions of american children. ANY child is at risk regardless of where they live, their socio-economic status, race or ethnicity. It is PREVENTABLE. Lead publications may be available through the Mississippi State Department of Health.

Discuss importance of:

- Hand washing, use soap and water (or baby wipes).
- Keeping child away from old painted surfaces.
- Wet mopping and hosing down porches and floors at least two times/week (not to dry scrape painted surfaces).
- Best type of flooring (vinyl linoleum- easier to keep clean). Wood floors should be covered with vinyl or coated with polyurethane or enamel paint.
- Use three buckets/containers when cleaning floors (wash, rinse, and empty). Squeeze dirty mop water into the empty bucket and dump contents into a toilet.
- A wet-dry vacuum cleaner (shop-vac) used in the wet mode after pouring cleaner onto a floor or other hard surface can remove more lead dust from hard surfaces than wet mopping alone.
- Using a HEPA vacuum cleaner (expensive) followed by wet mopping will remove the most lead dust from hard surfaces.
- In old houses/buildings, lead dust from paint may be in carpets/rugs and cloth furniture near windows and on porches. Lead dust may be on furniture near plastic mini-blinds and on furniture and car seats where people who work with lead have sat in their work clothes.
- HEPA vacuuming followed by steam cleaning will remove the most lead dust from carpets and rugs, cloth furniture and car seats. Using a fine-particle (micron or allergen) bag in a regular vacuum cleaner will help it to remove more lead dust.

- Discard dirty carpets and rugs and dirty cloth furniture on porches and outside near old houses. Cover furniture likely to have lead dust with washable coverings, such as sheets. In old houses use washable mats and vinyl runners where people walk a lot. Wash mats and runners at least twice a week.
- Keep children from touching surfaces in old houses/buildings likely to have lead-contaminated dust and dirt: porch surfaces, outside steps and ledges, window sills and troughs, and soil near house/building. Keep sand boxes and playground equipment away from old houses/buildings. Provide plastic chairs for young children sitting outside.
- Keep lead fishing sinkers, car and truck batteries and radiators in places not accessible to children.
- Abatement is the controlled removal or enclosure of lead-based paint. It MUST be done by a professional certified by the Mississippi Department of Environmental Quality (DEQ).
  DEQ phone number is 601-961-5171. Advise family members NOT to sand or scrape old paint themselves.
- Remember if abatements is carried out in your home: all scraping inside and outside should be done over plastic sheets after all furniture and personal belongings have been removed. Only paint wet with water should be scraped. Keep children and pregnant women away from abatement areas until a thorough clean-up has been done.
- Any family member or regular visitor who might be exposed to lead should change work clothes, shoes and shower at work. If this is not possible at work, as soon as you return home; be careful not to contaminate clothes, bedding, furniture, car interior, steps, and floors that children might touch. Lead-contaminated clothes should be stored in plastic bags and washed SEPARATELY from other clothes.
- Avoid ceramic ware (especially if imported from China, Mexico, Italy, or South Asia), old hand-crafted, and/or brightly colored, or ceramic covered in a dust, chalky residue. Avoid strong acidic or hot food/drink in these types of containers.
- IMPORTANT: Avoid food and drinks in imported cans. Avoid growing vegetables in soil near old houses/buildings or near old painted fences.
- Metal house and car keys may have lead. Don't let children play with them.
- Old bathtubs and sinks often have lead
- Window sills should be smooth and cleaned often with all purpose cleaners. Keep windows closed and cover windows troughs with aluminum coil stock. Cover peeling paint on window sills with plastic tape, contact paper or plastic sheeting.
- Remove imported/plastic/vinyl mini-blinds bought before 1997; they usually contain lead. Lead dust forms on these blinds and can collect on window sills and furniture nearby.
- Give out Lead Hotline Number. 1-800-LEADFYI (532-3394) or 1-800-424-LEAD (5323).

Review the following with adults who may be involved with jobs or hobbies that increase their risk of lead exposure.

List of Job/Hobbies that may involve lead:

- Paint removal, includes: sandblasting, scraping, abrasive blasting, sanding, or using a heat gun or torch,
- Chemical strippers
- Remodeling, repairing, or renovating buildings or dwellings, or tearing down buildings or metal structures (demolition)
- Plumbing
- Repairing radiators, Tire balancing
- Melting metal for reuse (smelting)
- Welding, burning, cutting, or torch work
- Pouring molten metal (foundries)
- Auto body repair
- Making paint or pigment
- Painting
- Salvaging metal or batteries
- Making or splicing cable or wire
- Creating explosives, ammunition, or fishing sinkers
- Making or repairing jewelry
- Making pottery
- Building, repairing, or painting ships
- Working in a chemical plant, glass factory, oil refinery, or any other work involving lead

Resources for more information:

- MS State Department of Health CLPPP (601) 576-7447
- UMC Poison Control (601) 354-7660 or 1-800-222-1222
- South East Pediatric Environmental Health Specialty Unit, Emory University Atlanta, GA (877) 337-3478
- Agency for Toxic Substance: 1-888-422-8737

Environmental Services

Environmental Investigation

The environmental investigation is done by the environmental lead specialist (Lead Environmentalist) of the Mississippi State Department of Health for children with a confirmed venous blood lead level of 20mcg/dL or higher and children with two venous blood lead levels of 15-19mcg/dL at least two months apart. An on-site assessment of lead hazards is done at each dwelling where the children spend at least six hours a week. They can also be done by other risk assessors certified by the Mississippi Department of Environmental quality.

The assessments include testing painted surfaces with an x-ray fluorescence (XRF) analyzer to determine the lead concentration of the paint and taking dust, soil and water samples that are sent to laboratories for analysis. Vinyl mini blinds, ceramic ware, and ceramic tubs and sinks are rubbed with qualitative testers that contain a chemical that changes color in the presence of lead. For each dwelling inspected, the environmental lead specialist prepares a report with a description of the lead hazards found and recommendations for reducing those hazards. A report on each dwelling frequented by a lead-poisoned child is sent to the child's primary care providers and parent(s) or legal guardians. A report without any blood lead levels or names of children to their caretakers is sent to the legal owner of each dwelling inspected. In the case of patients of the Mississippi State Department of Health, a report is sent to the coordinating nurse of the county health department and the district health officer. If a child's elevated lead level persists, a follow-up assessment may be done of dwellings already inspected. Follow-up assessments consist mostly of a visual inspection and dust wipe sampling.

<u>Environmental Investigation for Health Department Patients</u>
Contact the State Lead Coordinator at Central Office to arrange for an environmental investigation.The StateLead Environmentalist will perform an environmental investigations on venous blood lead levels greater than or equal to 20 mcg/dL, or persistent 15-19 mcg/dL (Persistent means: 2 venous blood lead levels in the range of 15-19 mcg/dL at least 2 months apart).

Copies of the environmental investigation reports for each lead poisoned child will be sent to the:

- County health department
- Child's parents or guardian
- District lead coordinator (MCH Coordinator or Epidemiology Nurse)
- State lead coordinator
- A copy of the environmental investigation report without patient names, relatives names or blood lead levels is sent to the legal owner of each dwelling inspected The results and recommendations of the investigation report will be discussed with the family by the environmentalist.

<u>Environmental Investigation for Primary Care Provider Patients</u>:
Primary Care Providers screening for lead poisoning are required to report all levels greater than or equal to 10 mcg/dL to the MSDH, state lead coordinator. Arrangements for these investigations will be made between the state lead coordinator, the lead environmentalist and the private provider.The state lead environmentalist will perform an environmental investigations on venous blood lead levels greater than or equal to 20 mcg/dL, or persistent 15-19 mcg/dL (Persistent 15-19 mcg/dL means: 2 venous blood lead levels in the range of 15-19 mcg/dL at least 2 months apart).Copies of the environmental investigation reports will be sent to the private provider, parent(s) and/or guardian(s) and the state lead coordinator .

Environmental Assessment

An environmental assessment is done by nurse or social worker. Listed below is a guideline of issues that may be addressed during an environmental assessment:

- Type of dwelling, age/condition of home
- Chipping, flaking, or chalking paint inside/outside of home
- Recent renovation or repair work
- Rent or own home; if rent, name, address, phone number of landlord
- Condition of surroundings: grass/dirt, etc., and type of dishes/cooking utensils used
- Condition and type of interior coverings, steps, porches, floors, ledges, window sills and walls.
- Any old cars, batteries, or machine parts in the yard or surrounding areas
- Any lead producing industries in the area
- Location of home; heavy traveled street/highway
- Any home remedies or medicines not prescribed by a doctor given to child
- Types of work done by relatives/friends who come in contact with child; lead exposure occupations
- Child's mouthing habits/pica, other children less than 6 years old in the home
- The importance of smooth, easily cleanable surfaces, such as floors and windows to reduce lead dust levels. Vinyl is the best floor covering. Check bathtubs and sinks, vinyl mini-blinds
- Dirty window sills with chipped paint that is hard to clean may be covered with plastic as a temporary measure.

PRENATAL AND POSTPARTUM WOMEN RECOMMENDATIONS

Lead is a neurotoxic metallic element that can be absorbed by the body primarily through the lungs and gastrointestinal system. Generally, lead poisoning occurs slowly, resulting from the gradual accumulation of lead in bone and tissue after repeated exposure. The two most common ways of exposure in adults are:

1. Inhaling particles, such as lead-based paint
2. Ingesting, such as lead-tainted water

Lead can damage almost every system in the human body, and it can also cause many conditions such as hypertension. It is primarily harmful to the developing brain of fetuses and young children under the age of seven. Very high levels of lead can also increase the risk of miscarriage. It can also cause the baby to be born too small or before term, premature. Since blood borne lead crosses the placenta, a pregnant women with an elevated blood lead level may expose her fetus to the toxic effects of lead therefore, infants born to mothers with elevated lead levels may also have elevated lead levels.

Prevention and Identification of Lead Poisoning in Pregnant and Postpartum Women

- All pregnant women should receive anticipatory guidance on preventing lead poisoning during the first and second trimester of their pregnancy. The health care providers should counsel women regarding risk for potential lead exposure.

- If a baby is born to a mother with potential exposure to lead poisoning (i.e. occupational, recreational) the umbilical cord blood should be tested to determine the newborns's blood lead level. The infant's pediatrician should be informed to ensure appropriate followup.

Nursing Management/Strategies:

- Review/counsel client regarding Lead and Pregnancy. Counseling may include (1) sources of lead, (2) occupational and recreational exposure, (3) effects of lead exposure, (4) risk reduction measures.

- Review nutritional status. Nearly all the body's lead is stored in the bones. During pregnancy, lead may be released with other minerals into the bloodstream and pass through the placenta to the unborn child.

- Take prenatal vitamins everyday. **Do Not** use bonemeal or dolomite as a calcium supplement (they may contain lead).

- Counsel clients related to smoking cessation and refer to smoking cessation class if available and/or desired. Women that smoke have tendencies to have decreased calcium levels which may increase blood lead levels than non-smokers.

Nutritional Information for Pregnant and Lactating Women

- Eat frequent and regular meals. Environmental lead is more easily absorbed on an empty stomach.

- Encourage client to eat foods high in calcium, vitamin C, and iron. A diet rich in iron and calcium reduces the absorption of lead. Iron or calcium deficits promote lead absorption.

- Breastfeeding is generally safe. However a woman with an elevated blood lead level who is breast-feeding should have her infant carefully and frequently monitored for elevated blood lead level. Refer to the Pediatric guidance for testing schedules.

ABATEMENT

The Mississippi State Department of Health does not provide funding for abatement. Abatement is the removal of either building components with lead-based paint, the paint itself, or the near permanent enclosure of lead-based paint hazards.

The State of Mississippi Department of Environmental Quality (MDEQ) Regulations for Lead-Based Paint Activities requires that a certified abatement firm be used for lead-based paint abatement activities and clean-up (clearance). A list of inspectors, risk assessors, supervisors, project designers, workers and abatement firms may be obtained form the Mississippi Department of Environmental Quality Lead-Based Paint Section at 877-671-7139 or 601-961-5171.

EPA requires that a certified abatement contractor be used for abatement and clean-up. A list of lead contractors may be obtained from the National Lead Information Center 800-424-LEAD or from the local EPA office or Department of Environmental Quality (DEQ) 601- 961-5171.

The Housing and Urban Development Office of Healthy Homes and Lead Hazard Control can provide information regarding funding resources at (202) 755-1785 also the following websites can provide information on Community Development Block Grants and HOME Participating Jurisdictions:

http://www.hud.gov/offices/cpd/communitydevelopment/programs/contacts/index.cfm
http://www.hud/gov/offices/cpd/affordablehousing/programs/home/contacts/index.cfm

The National Lead Information Center; Lead Hotline- (800) LEAD-FYI (532-3394)or (800-424-LEAD). These phone numbers can be given to the public. The hotline provides general information to the public. Callers may order information on Lead to be mailed or faxed to them including information on the federal real estate disclosure law and the following booklets: "PROTECT YOUR FAMILY FROM LEAD N YOUR HOME. "REDUCING LEAD HAZARDS WHEN REMODELING YOUR HOME" "LEAD IN YOUR HOME : A PARENT'S REFERENCE GUIDE"(AVAILABLE BY MAIL ONLY. AND ".LEAD PAINT SAFETY: A Field Guide for Painting, home maintenance, and renovation work" (available by mail only). There booklet's and other information can be seen on the internet at www.hud.gov/office/lead and at www.epa.gov/lead.

For information on the residential lead-based paint, see Appendix D, Federal Disclosure Law, and for Lead Hazards Standard see Appendix E.

Appendix A
Blood Lead Poisoning Summary Sheet

Blood Lead Poisoning Summary

MISSISSIPPI STATE DEPARTMENT OF HEALTH

Screen all children between the ages of 6 and 72 months at each well-child visit. To do so, use the CDC verbal risk assessment questionnaire below.

CDC Risk Assessment Questionnaire — A "yes" or "don't know" answer to any question means that the child is high risk.

Child's Name	Date of Birth	Date		Date		Date		Date		Date		Date		Date		Date	
		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
1. Does your child live or regularly visit an old house built before 1960?																	
2. Was your child's day care center/preschool/babysitter's home built before 1960?																	
3. Does the house have peeling, chipping, dusting, or chalking paint?																	
4. Does your child live in a house built before 1960 with recent, ongoing or planned renovation or remodeling?																	
5. Have any of your children or their playmates had lead poisoning?																	
6. Does your child frequently come in contact with an adult who works with lead? Examples are construction, welding, pottery, plumbing and other trades practiced in your community (lead babbitt & fishing weights)?																	
7. Does your child live near a lead smelter, battery recycling plant, or other industry likely to release lead such as — *(give examples)*																	
8. Do you give your child any home or folk remedies which may contain lead?																	
9. Does your child live near a heavily traveled major highway where soil and dust may be contaminated with lead?																	
10. Does your child drink well water and does your home have lead pipes, or copper pipes that are soldered with lead?																	
11. Does your home have imported /vinyl/plastic mini-blinds manufactured before 1997?																	

Elevated Blood Lead Levels

	Date and Signature	Level	Dates and Initial								Comments
Initial specimen drawn Specify cap. or venous		Lead Education									
Confirmatory venous Specimen drawn		Nutrition									
Repeat venous Specimen drawn		Lead Hazard Preventive									
Repeat venous Specimen drawn		Nursing/Social work Home Visit									
Repeat venous Specimen drawn		Referral to Environmentalist									
Repeat venous Specimen drawn		Environmental Inspection									
Repeat venous Specimen drawn		Referral for Clinical Management									
Repeat venous Specimen drawn											

MISSISSIPPI STATE DEPARTMENT OF HEALTH — Revised 9/4/02 — Form No. 222

Appendix B

MISSISSIPPI STATE DEPARTMENT OF HEALTH

Lead Poisoning Follow-Up/Home Visit

Label

General

Date of last blood lead level _____ Results _____

Parent/Guardian _____ Phone _____

Risk at last verbal questionnaire _____

Health Status

Date of most recent Denver II _____ Results _____

Symptoms of lead poisoning? ☐ No ☐ Yes —

☐ Irritability ☐ Restlessness ☐ Fatigue ☐ Behavior disorder

☐ Nausea ☐ Growth failure ☐ Hearing loss ☐ Unexplained seizures

☐ Other _____

Medical Evaluation/ Management

Primary care provider _____ ☐ MSDH ☐ Private provider

Address/Phone _____

Name of contact person _____ Date contacted _____

Treatment/follow-up plan _____

Oral Chelation recommended? ☐ No ☐ Yes

Home Visit

Date _____ How long at this address _____ Is child's current residence rental property? ☐ No ☐ Yes

If yes, name of landlord _____

Address/phone of landlord _____

Other address where child spends time (approximately > 6 hours/week) _____

Mouthing habits — ☐ Keeps thumb or fingers in mouth ☐ Carries a bottle or pacifier around

☐ Other _____ Pica — ☐ Paint chips ☐ Dirt ☐ Other _____

Does caregiver work with lead? ☐ No ☐ Yes, name _____

Relationship _____ Occupation _____

Was home built before 1960 ☐ No, date built _____ ☐ Yes, date built _____ ☐ Don't know

Mini blinds in home ☐ No ☐ Yes, date purchased _____ ☐ Don't know

Where does child play *(any area where lead might be found)* _____

_____

_____

_____

MISSISSIPPI STATE DEPARTMENT OF HEALTH Revised 02/06/02 Form No. 221

Front

Other Children In House ≤ 6 years old

Name	Birthday	Age	Already Tested or Appointment To Be Made	BLL Results	Medicaid No	Medicaid Yes

Lead Education

Name of Material	Date Given	Level of Understanding	Comments
What Everyone Should Know About Lead Poisoning #5396		☐ Good ☐ Fair ☐ Poor	
Lead Levels in Children #5127		☐ Good ☐ Fair ☐ Poor	
About Lead And Pregnancy #5128		☐ Good ☐ Fair ☐ Poor	
About Lead Paint Abatement #5126		☐ Good ☐ Fair ☐ Poor	
Lead Fact Sheet #5307		☐ Good ☐ Fair ☐ Poor	

Other referrals ☐ No ☐ Yes

Action taken — ☐ Referral to environmentalist Date _____ ☐ Follow-up appointment made Date _____

☐ Other _____ Date _____

Additional information _____

Signature _____ Date _____

Back

Appendix C

Reportable Disease and Conditions

Disease or Condition:_____ Date of Onset: ____/____/_____

Method of Diagnosis: Clinical ☐ and/or Laboratory ☐ Specific Name of Test:_____

Specimen: *(blood, CSF, sputum, stool, etc.)* _____

If hospitalized, chart number:_____ Date Laboratory Specimen Obtained: ____/____/_____

Name of Patient:_____ Occupation:_____

Address:_____ Phone: *(home)*_____ *(work)*_____

City:_____ Zip Code:_____ County:_____

Date of Birth: ____/____/_____ Current Age:_____ Sex:_____ Race:_____ Hispanic Origin: Yes ☐ No ☐

Is patient a foodhandler? Yes ☐ No ☐ Child/worker in day care? Yes ☐ No ☐

Person Reporting:_____ Attending Physician:_____

Name of Hospital, Clinic/Etc.:_____ Phone:_____

Phone:_____ Date of Report: ____/____/_____ *(continue on back)*

Front

Mississippi State Department of Health Revised 1-20-93 Form No. 135

Disease or Condition Specific Information *(complete if appropriate)*

If Hepatitis:

Hepatitis A **IgM** antibody: Positive ☐ Negative ☐ Not Done ☐

Hepatitis B **IgM** core antibody: Positive ☐ Negative ☐ Not Done ☐

If negative, is person a known carrier/chronic case? Yes ☐ No ☐

Hepatitis C antibody: Positive ☐ Negative ☐ Not Done ☐

Was patient jaundiced? Yes ☐ No ☐

Is patient pregnant? Yes ☐ No ☐

Chemistry Results:		*(Normal Range for Test)*
Total Bilirubin:	_____	_____
SGOT (AST):	_____	_____
SGPT (ALT):	_____	_____

If Mycobacterial Disease:

PPD Mantoux: Date____/____/____ ____mm

Sputum: Date____/____/____ Smear____ Culture___

Tissue or Body Fluid: Date____/____/____

Smear____ Culture____

Chest X-Ray: Date____/____/____

Normal____ Abnormal____

Cavitary____ or, Noncavitary____

SSN_____ - _____ - _____

If *H. influenzae, N. meningitidis, Shigella, Salmonella,* or *Campylobacter*

Group and/or serotype:_____

If Injury *(spinal cord or head)*, Cause: *(circumstances)*_____

Geographic Location of Occurrence:_____ Work Related: Yes ☐ No ☐

Back

Individual case reports of influenza-like illnesses are not required.

Campylobacter pylori is not reportable.

Mississippi State Department of Health Revised 1-20-93 Form No. 135

Appendix D

Lead Fact Sheet

Mississippi State Department Of Health

What is lead?

Lead is a heavy metal that can be found in many sources.

Lead is found in:

- ☐ Lead-based paint
- ☐ Soil and dust
- ☐ Tap water
- ☐ Glazed pottery
- ☐ Imported/vinyl/plastic mini-blinds bought before 1997
- ☐ Keys
- ☐ Batteries
- ☐ Imported canned foods

Protect your child from lead:

- ☐ Clean your child's hands with soap and water or baby wipes after playing outside and before meals.
- ☐ Keep your child from eating paint chips, dust or dirt. Keep children from touching window troughs (wells) in old homes and outside surfaces (steps and porch floors) near old homes. Use a wet mop or wet cloth with an all-purpose cleaner to clean areas of dust or chipped paint on window sills, interior floors, porch floors, ledges and outside steps. Keep children's hands and toys off these areas. Surfaces that children touch often should be smooth and easily cleaned. Vinyl floor coverings are the easiest to keep clean.
- ☐ If someone in the household works around lead, such as in a battery plant, take special measures to avoid bringing lead dust into the home.
- ☐ Wash your child's toys often.
- ☐ Give your child a diet rich in vitamin C, calcium and iron. Some good sources are milk, oranges, tomatoes, green leafy vegetables, bread, cereal and meat.
- ☐ Have your home checked for lead before you remodel. Do not scrape or sand lead-based paint.

Is lead harmful?

Yes, an excessive amount of lead in the body can cause learning and behavior problems. Lead can also cause serious health problems, even death.

Signs or symptoms of possible lead poisoning:

Often the danger of lead is hard to see. Signs of damage sometimes show later. Some symptoms include

- ☐ irritableness
- ☐ restlessness
- ☐ frequent tiredness
- ☐ nausea
- ☐ behavior disorder
- ☐ unexplained seizures
- ☐ developmental delay
- ☐ growth failure
- ☐ hearing loss
- ☐ learning problems

Front

Is your child at risk for lead poisoning?

- ☐ Does your child live in or regularly visit an old house, one built before 1960?
  Was your child's day-care center/pre-school/baby-sitter's home built before 1960?
  Does the house have peeling or chipping paint?
- ☐ Does your child live in a house built before 1960 with recent, ongoing, or planned renovation or remodeling?
- ☐ Has your child or any playmate had lead poisoning?
- ☐ Does your child frequently come in contact with an adult who works with lead? Examples are construction, welding, pottery, car and truck radiator repair, working with cable wire, and working at a recycling center.
- ☐ Does your child live near a lead smelter, battery recycling plant, or other industry likely to release lead?
- ☐ Do you give your child any home or folk remedies which might contain lead?
- ☐ Does your child live near a heavily travelled major highway?
- ☐ Does your home's plumbing have lead pipes or copper with lead solder joints?
- ☐ Are there imported/vinyl/plastic mini-blinds manufactured before 1997 in your home?
  Blinds manufactured before 1997 are likely to have lead. Lead dust on these blinds can accumulate on window sills, the tops of chair and sofa backs and on other surfaces under the blinds.
- ☐ Does your child play with keys?
- ☐ Are there lead fishing sinkers in your home?

If you answered "yes" to any of the questions above, please discuss the possibility of lead poisoning with your child's physician or the nurse at the local county health department.

MISSISSIPPI STATE DEPARTMENT OF HEALTH

Equal opportunity in employment/services

07/25/02

Catalog # 5307

Appendix E
Federal Disclosure Law

The federal Residential Lead-Based Paint Hazard Reduction Act, 42 U.S.C. 4852d, requires sellers and landlords of most residential housing built before 1978 to disclose all available records and reports concerning lead-based paint and /or lead-based paint hazards, including the test results contained in the enclosed report, to purchasers and tenants at the time of sale or lease or upon lease renewal. This disclosure must occur even if hazard reduction or abatement has been completed. Failure to disclose these tests results in a violation of the U.S. Department of Housing and Urban Development and the U.S. Environmental Protection Agency regulations at 24 CFR art 35 and 40 CFR Part 745 and can result in a fine of up to $11,000 per violation. To find out more about your obligations under federal lead-based paint requirements, call 1-800-424-LEAD.

Besides the disclosure of known lead-based paint hazards, the law requires the following before ratification of a contract for housing sale or lease:

Sellers and landlords must give buyers and renters the pamphlet titled Protect Your Family from Lead in Your Home.

Home buyers will get a 10-day period to conduct a lead-based paint inspection or risk assessment at their own expense.

Sales contracts and leasing agreements must include certain notification and disclosure language.

The following types or pre-1978 housing are not covered by the law:

Zero-bedroom units, such as efficiencies, lofts, and dormitories.

Leases for less than 100 days, such as vacation houses or short-term rentals.

Housing for the elderly (unless children live there).

Housing for the handicapped (unless children live there).

Rental housing that has been inspected by a certified inspector and found to be free of lead-based paint.

Foreclosure sales.

Appendix F
Lead Hazards Standards

The U.S. Environmental Protection Agency (EPA) considers lead loadings of dust wipe samples are expressed as micrograms (ug) of lead per square foot of surface area wiped. Lead hazard is when the lead loadings of dust wipe samples exceed the following amounts:

- Bare and carpeted floors ▸ 40 ug/sq. ft.
- Interior window sills ▸ 250 ug/sq. ft.
- Window troughs (wells) ▸ 400 ug/sq. ft.

EPA considers lead in bare soil to be a hazard when it exceeds a concentration of 400 ppm in children's play areas and 1200 ppm in other areas. EPA recommends removal , disposal in a sanitary landfill, and replacement of the soil at lead concentrations over 5000ppm. The EPA maximum contaminant level (MCL) for lead in drinking water is 15 parts per billion (ppb).

EPA also considers lead-based paint to be present on any surface that contains lead equal to or in excess of 1.0mg/sq.cm. (on-sit x-ray fluorescence testing) or 0.5% by weight (laboratory analysis). Lead-based paint is a hazard if it is deteriorating, is on a friction or impact surface (window components, doors, door frames, steps, floors), or is on child-accessible surfaces that show evidence of teeth marks.

The U.S. Department of Housing and Urban Development (HUD) uses these same lead loadings as clearance dust standards for interior floors and window sills following lead hazard control work. Also, HUD has established 400ug/sq.ft. as a clearance dust standard for window troughs (wells).

Although HUD and EPA have not established any standards for dust wipe samples taken on exterior surfaces, lead dust on these surfaces (e.g. steps, porch floors, hand rails) are often significant sources of lead in the environment of a lead-poisoned child.

The HUD action level for paint is 0.5% by weight by laboratory analysis or 1.0 mg/sq.cm for onsite x-ray fluorescence (XRF) testing.

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